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Honduras and Nicaragua had never been fixed; the two last named never recognized the existence of a Mosquito nation, but their effective jurisdiction did not extend to the east of an irregular line reaching from the eighty-third to the eighty-sixth degree west of Greenwich. 175

In those days the project of an interoceanic canal through the Isthmus of Nicaragua was occupying the principal maritime nations of Europe and the United States as well. The latter country had never viewed with favor the continual encroachments of Great Britain upon Central America. But when the English in 1848 took forceful possession of San Juan del Norte, the Atlantic terminus of the projected canal, the North American Republic openly took sides with Honduras and Nicaragua. Pressure from the United States forced England to sign in 1859 and 1860 treaties with Honduras and Nicaragua, by virtue of which the Mosquito Coast was recognized as part of the two Central American republics.

The part of the country situated between Rio Hueso on the north and Rio Punta Gorda on the south and extending inland to 84° 15′ W., was, however, made into a reservation wherein the aborigines were to be allowed a certain autonomy. At the head of this reservation was the King, whose title was now changed to that of "Chief" (*Jefe*).

Most of the Indians, Miskito as well as Sumu, were not living within the boundaries of this newly created territory. The government of the latter was chiefly in the hands of native English-speaking "Creoles" or Jamaican immigrants. These were strongly opposed to Nicaraguan influence. The authorities of the reservation were constantly at odds with those of Managua, and the sovereignty of the Republic was only nominal. In 1881 some of the arising disputes were submitted for arbitration to the Emperor of Austria. Finally in 1894 Zelaya, President of Nicaragua, forcefully took possession of the Mosquito Reservation and ousted the local authorities; the country was then incorporated in the Republic as the *Departamento de Zelaya* (now *Departamento de Bluefields*).

SHORT ACCOUNT OF THE ETHNOGRAPHICAL EXPLORATION OF THE MOSQUITO COAST.—Columbus sailed along the Mosquito Coast from north to south in 1502, but he appears not to have come in contact with either Miskito or Sumu. Between the years 1513 and 1529 the versatile historiographer of the Indies, Gonzalo Fernández de Oviedo (1478–1557), spent some time on the Pacific coast of Nicaragua. His great work, which was not published completely until 1851–1855, deals, however, almost exclusively with the Nicarao and Chorotega as far as Nicaragua is concerned, and only a few vague statements refer to the "Chontales," a general designation under which the primitive tribes of the Atlantic coast were known in those days. Benzoni, Castañeda, Andagoya, García Palacios, and Motolinia all personally 175 114

1: Conzemius M-4, 5 (1921) 1932
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visited Nicaragua or Honduras, but the rude Atlantic tribes were entirely ignored by them, just as they were by the other celebrated chroniclers, Gómara, Herrera, and Torquemada.

A few ethnographical details pertaining to the Indians of Rio Patuca (Sumu or Paya) have been left by the Franciscan missionary Espino, who remained in that region from May, 1667, until the beginning of 1668.

The author of the first famous work on the buccaneers, A. O. Exquemelin (name corrupted by the English into Esquemeling and by the French into Oexmelin), who came as an engagé to the West Indies in 1666, visited the Mosquito Coast in 1671 or 1672. He had joined the buccaneers in those days and among them appears to have performed the functions of barber-surgeon. In this capacity he accompanied Morgan on his famous raid on Panama in 1671. From the latter place his vessel sailed northward along the Atlantic shore of Central America, stopping at Bluefields Lagoon where the buccaneers were attacked by Sumu Indians. The vessel then stopped for some time at Cabo Gracias. Exquemelin's work was published in Dutch in Amsterdam in 1678. It was translated in German (1679), Spanish (1681), English (1684), and French (1686). Numerous editions have appeared since in many languages, and the book forms the basis of practically all the popular accounts of the seventeenth century buccaneer captains. The translations have appeared with serious additions, omissions, and alterations, each translator having been endeavoring to present his own country in the most advantageous light. The French translations especially contain additions of other French buccaneers not mentioned in the Dutch original, while the English editions glorify particularly the sack of Panama by Morgan. Exquemelin's work gives some very interesting accounts regarding the Miskito of Cabo Gracias a Dios.

The famous English navigator, William Dampier, who was born in 1652 as the son of a Somersetshire farmer, sailed to the West Indies in his youth. From 1675 to 1678 he was active as logwood cutter in Campeche and in 1680 he joined the buccaneers. In later years Dampier became very celebrated. On board a buccaneer vessel he visited Bluefields Lagoon and the Corn Islands, which enabled him to give us a few ethnographical details regarding the aborigines (Sumu) of those parts and the Miskito of Cabo Gracias a Dios. Dampier's great work, A New Voyage Round the World, which appeared in London in 1697, had a tremendous success and within a few years a great number of editions appeared in English, French, German, Dutch, and other languages.

The Parisian buccaneer, Raveneau de Lussan, a well-educated nobleman, who joined the buccaneers at Santo Domingo in 1684, is the author of a book (Journal du Voyage, etc., Paris, 1689) on the exploits

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of the French and English adventurers in the Pacific Ocean from March, 1685, to December, 1687. Being pursued by superior Spanish forces, these buccaneers abandoned their vessel in the Gulf of Fonseca and walked to the upper course of Rio Coco, down which they descended in rafts to the Miskito settlements around Cabo Gracias a Dios.

The great naturalist, Sir Hans Sloane, has also left us a few details pertaining to the Miskito whom he had met in Jamaica. On the arrival of each new governor of that island the Miskito King came over to Jamaica with a number of his men, as he had a commission from the governor. Sloane had thus occasion to meet these Indians in 1688 and again in 1725.

But the most detailed account of the aborigines of the Mosquito Coast, written in early days, is that of an Englishman, probably a former buccaneer, who signs merely "M. W." (The Mosqueto Indian and His Golden River). He had an intimate knowledge of the Miskito and also gives some details pertaining to the Sumu.

Over 100 years passed until another careful observer has left us an account of the Indian tribes under consideration. Orlando W. Roberts was active as a trader on the eastern coast of Central America from the Gulf of Darien to the Bay of Honduras, (1816–1823). He refers chiefly to the tribe of the Miskito.

During the years 1839 to 1842 Thomas Young was living around Rio Tinto. He was deputy superintendent of the British Central America Land Co., which was endeavoring to colonize that part of the Mosquito Coast. Young had an intimate knowledge of the various tribes of Indians as they really were in those days.

From June to August, 1844, a commission of three Germans (Messrs. Fellechner, Müller and Hesse) was looking over the coastal region of Honduras between Cabo Gracias a Dios and Rio Patuca in order to determine the advisability of establishing a German colony there.

Another German, Julius Fröbel, who was compelled to leave his native country as a result of the political events of 1848, spent some time in 1850 and 1851 around the great lake region of Nicaragua and on the upper Rio Escondido among the Ulwa Indians.

For much valuable information pertaining to the Miskito and Sumu we are indebted to three Englishmen who came to the country in the following years. The most important one among them is Charles Bell, who lived in the country during his youth, from 1846 to 1862, his father being attached to the government of the "Kingdom." He had a very intimate knowledge of that part of the country situated to the south of Rio Coco. Between 1863 and 1868 John Collinson, a civil engineer, made two voyages to the Mosquito Coast, being employed by Commander Pim to survey from Lake Nicaragua

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to Punta Gorda for a proposed railway. The naturalist H. A. Wickham lived in Nicaragua (Rio Escondido and Pearl Lagoon) from October, 1867, to June, 1868, in order to collect birds. His ethnographical notes pertaining to the Ulwa are of great interest.

A few years later the French mining engineer, Paul Lévy, traveled on the Mosquito Coast to carry on researches for the Government of Nicaragua. Among the minor contributors to the ethnology of the Mosquito Coast of the nineteenth century are the following: Bovallius, the Swedish zoologist (1881–1883); K. von Girsewald (1892), who spent six months in the gold regions of Pispis; Bruno Mierisch, the government engineer of Nicaragua, who explored the gold regions between Rio Coco and Rio Grande in 1892 and 1893.

In 1900 the celebrated German traveler, Dr. Karl Sapper, who is intimately acquainted with Central America, visited the Miskito and the Sumu living on and about Rio Bocay. The ethnographical specimens collected by him are in the Stuttgart Museum. A collection of ethnographical and archeological material obtained by Doctor Neuhaus around Rio Escondido about this same period is in the Museum für Völkerkunde (Berlin). The German linguist, Walter Lehmann, also investigated these tribes in the course of his voyage to Central America (1907–1909), but unfortunately the ethnographical part of his studies has not yet appeared. The Honduran schoolteacher, Francisco Martínez, also collected interesting ethnological data during his stay at the Sumu village Guampú on Rio Patuca (1916–17). Unfortunately his various contributions have all appeared in local newspapers and reviews of very difficult access.

Finally mention must also be made of the work done by several Moravian missionaries, especially Heath, Grossmann, Reichel, Martin, Ziock, and Siebörger. The books by Schneider and Brindeau are based nearly exclusively upon the investigations of these missionaries.

Since the war the work has been continued by Americans. H. J. Spinden visited Rio Coco and the coast of Nicaragua in 1917–18, and the coast of Honduras in 1923. Dr. A. H. Schultz, of the Johns Hopkins Medical School, carried on some anthropological studies on the Atlantic coast of Nicaragua, examining 25 Rama and 12 Sumu Indians. During the same year (1924) D. E. Harrower, of the Museum of the American Indian, Heye Foundation, was collecting ethnological specimens during two months among the Miskito, Sumu, and Rama.

GENERAL REMARKS ON THE MISKITO

The Miskito are estimated at about 15,000, which number exceeds that of all the other Indian tribes of the Mosquito Coast combined. They are largely mixed with Negroes, for which reason the Spaniards have called them "Zambos," meaning Negro and Indian half-breed, a name which is appropriate.

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PREFACE

114 This medical survey and the health program connected with it was conceived by Mr. John Collier, who was Commissioner of Indian Affairs, Dr. Manuel Gamio, the Director of the Inter-American Indian Institute, and the Committees of Health and Sanitation of the National Indian Institutes of the United States and Nicaragua, and the Office of Inter-American Affairs.

121 The primary purpose of this study was to ascertain by what measure a health program could be initiated in a sequestered low-land tropical region for inhabitants who were autoctonous Indians to that area. The survey and the program were by no means complete since the main efforts were directed to the salient problems pertinent to the health of the people. Furthermore, considerable emphasis was given to the customs and habits of the Indians since any program in order to survive must be fitted into the lives of the people and the circumstances of the local situation. And, since the writer was specializing in the field of nutrition, the subject received disproportionate study.

122 123 The limitations of this study can be set forth. The first of these was the short time spent in the Coco Basin, a period of two months hardly being sufficient for a medical survey. The second was that no specific exhaustive anthropological method was used to study the social behavior of the Indians. But this second limitation is of no great consequence since the procedures ordinarily employed have not as yet attained quantitative values. But time should have been taken to gain a further insight into the views which these Indians held with respect to medical care. So far the authors' meagre observations form the only data from which to infer conclusions; certain "single methods" were employed and it is not too sanguine to state that still more important factors in the life, as it affects Public Health of these Indians are yet to be ascertained. Without, however, anticipating future inquiries, there is presented herewith those factors, medical and social, which the investigator deemed as sufficient in quantity to allow a recommendation for the health program of the Miskito without disrupting the social values of these people.

[p.3] [p.2 has no text material]

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114 Vague mention was made of the Atlantic seaboard Indians by Gon-
175 zalo Fernández de Oviedo (1478-1557) who was residing temporarily on the Pacific Coast of Nicaragua. A better account was given by the Franciscan missionary Espino[2] who had lived on the eastern coast during the year 1667-1668 (Río Patuca). It was during this period that the English entered into friendly and commercial relations with Indians; British traders arrived with increasing frequency and eventually garrisons were established. During this period there was also considerable trade with English buccaneers. The author of the first scholarly work on buccaneers, A. O. Exquemelin (English: Esquemeling; French: Oexmelin), came to the West Indies in 1666 and visited the Mosquito Coast of eastern Nicaragua in 1671. He had joined the buccaneers and had apparently assumed the function of barber-surgeon. It was, at any rate, in this capacity that he accompanied Morgan on his famous raid on Panama in 1671.[3] Exquemelin's original work in Dutch (Amsterdam, 1678), later translated into German (1679), Spanish (1681), English (1684), and French (1686), not only forms the basis for all of the popular accounts of the Seventeenth Century buccaneer captains but yields important descriptive information of the places he visited, especially the Mosquito Coast. Following Exquemelin, numerous other early historiographers have made accounts of the territory (vide: Dampier[4] Raveneau de Lussan[5] Sloane[6]).

175 In 1786 by virtue of a treaty with Spain, Great Britain agreed to yield the territory and to recognize the sovereignty of the King of Spain over it.[7] Somehow the Spaniards were unable to maintain a foothold in this area, a situation presumably due to the persuasive power of the English over the Indians in encouraging hostility towards the new government. In 1821 the States of Central America declared their inde-

[2] Espino, Fray Fernando. Relación Verdadera de la reducción de los Indios infieles de la provincia de Taguisgalpa, llamados Xicaques, cuyos operarios han salido, y salen desta provincia del SS. Nombre de Jesús de Goatemala, desde 1612, hasta el presente año de 1674, Guatemala, 1674.

[3] Exquemelin, A. O. De Americaensche Zee-Rovers, Amsterdam, 1678; Americanische Seeraüber, Nurnberg, 1679; Piratas de la América, Koln, 1682; Buccaniers of America, London, 1893; Histoire des Aventuriers qui se sont signalez dans les Indes, 2 vols., Paris, 1686.

[4] Dampier, William. A New Voyage Round the World. Fourth edition, 2 vols., London, 1699.

[5] Raveneau de Lussan. Journal du Voyage fait à la Mer du Sud. par les Filibustiers de l'Amerique en 1684 & années suivantes. Paris, 1689.

[6] Sloane, Sir Hans. A voyage to the Islands Madera, Barbados, Nieves, S. Christophers and Jamaica, etc. 2 vols. London, 1707-1725; A New History of Jamaica from the earliest accounts, etc. Second edition, London, 1740.

[7] Stout, Peter F. Nicaragua: Past, Present and Future. Philadelphia, 1859.

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pendence from Spain and the English authorities from Jamaica renewed their friendly relations with the Indians. In fact, one of the chiefs from the area was crowned with solemnity by the British at Belize, British Honduras, and made king, thus reestablishing a British protectorate system. The "Mosquito" (Miskito) Kingdom in those days included the whole Atlantic Coast of Central America from Chiriqui Lagoon (latitude 9° N.) to Cabo Honduras, a coastline of 700 miles.[7] However, in 1847 the territory became restricted to the territory between Cabo Honduras and Río San Juan, the jurisdiction of which was under British colonials. During these years under British supervision Orland W. Roberts,[8] an active trader on the eastern coast of Nicaragua, gave an accurate account of Miskito Indian customs. Reports were also given by Young,[9] Fröebel,[10] the most important being the text by Bell,[11] who lived in the territory from 1846 to 1862. From 1863 to 1868 John Collinson, a civil engineer, made two voyages to this coast and left an account of his travels.[12] H. A. Wickham,[13] (1867-1868) made a collection of birds from Río Escondido and Pearl Lagoon; P. Levy made researches for the Nicaraguan government[14] and other studies were made by the Swedish zoologist Bovallius,[15] and by K. Von Girsewald, [16] B. Mierisch,[17] and K. Sapper, who obtained a series of ethnographical specimens for the Stuttgart Museum.[18]

Inasmuch as there is a considerable admixture of Negro with the Miskito Indians it may be well to examine the possible reason for this

[8] Roberts, Orlando W. Narrative of Voyages and Excursions on the East Coast and in the Interior of Central America. Edinburgh, 1827.

[9] Young, Thomas. Narrative of a Residence on the Mosquito Shore, During the Years 1839, 1840 and 1841. London, 1895.

[10] Fröebel, Julius. Aus Amerika. Erfahrungen, Reisen und Studien. 2 vols. Leipzig, 1857-1858.

[11] Bell, Charles Napier. Remarks on the Mosquito Territory; its Climate, People, Productions, etc. Journal of the Royal Geographical Society, 1862, 32, 242-268. London.

[12] Collinson, John. The Indians of the Mosquito Territory. Memoirs of the Anthropological Society of London. 1870, 3, 148-156. London.

[13] Wickham, H. A. Notes of a Journey among the Woolwa and Moskito Indians. Proceedings of the Royal Geographical Society. 1869, 13, 58-63. London.

[14] Levy, Paul. Notes geografiques y económicas sobre la República de Nicaragua. Paris, 1873.

[15] Bovallius, Carl. Resor i Central-Amerika (1881-1883) Upsala, 1887.

[16] Girsewald, K. Von. Sechs Monate in Nicaragua. Braunschweig, 1896.

[17] Mierisch, B. Eine Reise nach den Goldgebieten in Osten von Nicaragua. Petermanns Mitteilungen. 1898, 88, 25-30. Gotha.

[18] Sapper, K. Reise auf dem Rio Coco (Nordliches Nicaragua). Globus, 1899, 76, 269-272, 271-276, Braunschweig; Proceedings of the Nineteenth International Congress of Americanists, 1917, 206-210.

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In recent times important contributions with regard to the Miskito Indians have been made by H. J. Spinden,[25] A. H. Schultz,[26] D. E. Harrower[27] and the exhaustive investigations of E. Conzemius.[28]

THE TROPICAL SITUATION

The status of peoples living in the tropics and semi-tropical regions varies considerably, depending on environment and man's adaptation to his habitat.[29]. Different foods are produced under different conditions. Thus, in the inner jungles and in certain highlands, very little food may be available; along the rivers it may be plentiful, and along the seashore other food sources may manifest themselves. Climate, geography, and socio-economic factors have a direct bearing on food availability and consumption.[30] Food habits naturally follow a similar pattern: the classical tortilla of Mexico and the Middle American countries; the use of manioc in the Amazon area; the dehydrated potato (chuño) of the Andean altiplano, the all too starchy diet which has developed in the Caribbean areas, all have their explanation in the factors typical of each area. Furthermore, when natives come into contact with other cultures, deculturation processes in the dietary pattern often take place.[31] These deculturation processes are not limited to clashes between Indian and white cultures, such as prevail in most of Latin America, but to the adaptation and absorption of dissimilar cultures not of Indian origin, such as in Puerto Rico and the southwestern States of this country, where the Hispanic and the Anglo-Saxon mode of life meet. Procurement of food in industrial areas by low income groups may modify the diet considerably. With this in mind no gene-

[25] Spinden, H. J. The Chorotegan Culture area. XXI° Congrès International des Americanistes (529-545) Goteborg, 1925.

[26] Schultz, A. H. Anthropological Studies on Nicaraguan Indians. Amer. Jour. Physical Anthropology, 1926, 9, 65-80.

[27] Harrower, D. E. Rama, Mosquito and Sumu, of Nicaragua. Museum of American Indian, Heye Foundation. 1925, 2, 44-48.

[28] Conzemius, E. (see footnotes Nos. 1 and 23), also: Die Rama Indianer von Nicaragua. Zeitschrift für Ethnologie, 1921, 53, 291-362 (Berlin); Apuntes sobre algunos Nombres Geográficos Mosquitos en Costa Rica y Panamá. Revista de Costa Rica, 1922, 309-326; Les Iles Corn de Nicaragua. La Geographie, 1929, 52, 346-362 (Paris).

[29] Pijoán, M. Certain Factors involved in the Struggle Against Malnutrition and disease. Univ. of New Mexico Press, 1943. Inter-Americana Monographs.

[30] Eggan, F., and Pijoán, M. Some Problems in the Study of Food and Nutrition. América Indígena. 1943, 3, 9-22.

[31] Pijoán, M., and Elkin, C. A. Secondary Anemia due to Prolonged and Exclusive Milk Feeding Among Shoshone Indian Infants. Jour. Nutrition, 1944, 27, 67-75.

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146 164 tation have chronic diarrhoea, some have glossitis,[65] occasionally leucopenia and lymphocytosis is observed. Reticulocyte counts usually were under 3 per cent and studies on platelets show them to be within normal limits. These findings indicate some unusual process in Necator hypochromic anemia.

Our own assays of the worms themselves reveal an iron content of only 1-2 mg. Fe per kilogram. It seems unlikely therefore that iron consumption by the worm plays a rôle in the anemia.

WORM INFESTATIONS

164 114 Because the writer is not a helminthologist the classification of intestinal parasites is not a complete one and depended considerably on the aid given him by laboratory assistants. However, certain aspects of the subject are intriguing. Sandground[66] has pointed out that the data dealing with intestinal parasites can be collated in such a way as to throw light on the racial origins of some of the Indians and to bear witness to the invasion of Central American countries by alien races. Von Thering according to Sandground had demonstrated the value of testimony from the world of parasitism as an aid to zoogeography and paleozoology. For instance, in recognizing the close affinities between the tapeworms harbored by marsupials in South America and Australia, Zschokke[67] presented evidence of a phylogenetic relationship in their hosts. Metcalf[68] also demonstrated by studies on opalinid ciliates in Amphibia a genetic relationship between frogs of South America and Australia and brought out new facts which tended to corroborate hypotheses in geography dealing with land masses connecting now isolated continents. Using information on the history of certain infectious diseases, and their prevalence in certain races, Williams[69] used the host-parasite association as a means of studying racial relationships among American Indians.

[65] Ashford, B. K., King, W. W., and Gutiérrez, P. Report of the study and treatment of "anemia" in Porto Rico. Bur. Print. and Supplies, San Juan, 1904.

[66] Sandground, J. H. Consideration of relation of host specificity of helminths and other metazoan parasites to phenomena of age resistance and acquired immunity. Parasitology, 1929, *21*, 227-255.

[67] Zschokke, F. Die Darmcestoden der Amerikanischen Beuteltiere. Centralbl. f. Bakteriol. 1904, *36*, 51-62.

[68] Metcalf, M. M. Bull. 129, U. S. Nat. Mus. 1923: Smithsonian Misc. Coll. 1929, *81*, No. 18.

[69] Williams, H. U. The epidemic of the Indian of New England, with remarks on Native American Infections. Johns Hopkins Hosp. Bull. 1909, *20*, 340-349; 1616-1620.

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Combined results of the malarial survey at Saulpaca (Zapaca) and San Carlos 164

Age	Total N° of Persons	Spleen examination Positive Splenomegaly		Positive Blood smear for parasites	
Years		Saulpaca	San Carlos	Saulpaca	San Carlos
0-1	40	0	11	6	10
2-4	46	2	15	13	17
5-9	128	3	52	46	55
10-14	80	2	34	27	36
15-19	41	2	18	14	20
50-54	34	0	8	8	9

the proximity of Bilwas Karma where certain public health measures have been introduced to expect a decreased incidence of disease. However the problem of clinical malaria remains a challenge and suppressive measures with atabrine or similar drugs may do much for these communities; the use of effective insect control with modern insecticides may play a major role in the future village control of insect borne disease. From the values given in the examination for malaria it is obvious that the disease constitutes the mayor health problem of the area. At Waspam, Bilwas Karma, the following mosquitoes were collected by [134] our party, these were: *Anopheles albimanus, A. albitarsis, A. aquasalis, A. argyritaris, A. parapunctipennis, A. pseudopunctipennis,* (several varieties), *A. vestitipennis, and A. crucians* (reported to be collected by Kumm). *A. albimanus* was found in great numbers and is probably the principal transmitter of malaria. This species is found in humid tropical climates and its breeding places are in the swamps exposed to the sun. However it has been known to exist at altitudes of 1350 meters (Guatemala City) and is the most common vector.

Syphilis

Hrdlicka[69] has pointed out that there is no substantial evidence [64] of precolumbian syphilis. On the other hand Williams and Wakefield, [114] Dellinger and Camp[69] regard the conclusions of their studies as being [71] sufficient to substantiate the view that syphilis was endemic in North America prior to European contacts. Regardless of controversy, sy-

[69] Hrdlicka, A. Disease, medicine and surgery among American aborigines (Geo. M. Kober Lecture). Jour. Amer. Med. Assoc. 1932, 99, 1661.

[69] Wakefield, E. G. Dellinger, S. C. and Camp, J. D., Study of osseous remains of "mound builders" of eastern Arkansas. Amer. Jour. Med. Sciences, 1937, 193, 448.

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164 philis, today among Indians, is a disease that deserves further study.
114 Dr. Mitchell Frank[91] has repeatedly stated that many cases with positive serologic evidence do not show clinical manifestations of syphilis nor is there anything which could be construed to indicate syphilis in the history. He points out furthermore that some of these cases on treatment have changes in serological findings but others do not. He has endeavored to perform all of precipitation — flocculation was well as the modifications of the Wasserman reactions and he is not satisfied with the status of this subject among Indians. Lynwalter[92] in 1923, in a study of Pueblo Indians found that 31 per cent had serologic evidence of syphilis and Dr. Frank does not believe that all these subjects were endowed with the disease. Plant[93] in South Dakota found serologic positives in Indians in 10.9 per cent of the men and 7.3 per cent of the women; Clarke[94] in New Mexico showed a serologic case rate of 1.5 for Indian males and 2.3 for Indian females. Dunham, Aberle, Farquhar and D'Amico[95] stated that positive serologic evidence was present in 2 per cent of the Indian children; Mountin and Townsend[96] report on incidence of 6.6 per cent among Indians studies. Pierce[97] has stated that there is something peculiar to the results obtained with precipitation flocculation tests among Indians and that the Wasserman reaction may be involved as well. Other considerations are the changing nature of the disease itself as exists over a period of years within a community and the effects of interracial marriages.

With regard to syphilis in Central Nicaragua, Rosenfeld[90] in his report stated "syphilis too is apparently very prevalent, several cases suggesting congenital and central nervous infections having been observed". It was, however, our impression that syphilis when present existed only in certain communities and rarely in others. Although there was no opportunity to perform routine serological testing, the clinical evidence of the disease was rare in all of the small

[91] Frank, Mitchell, Senior Physician, United Pueblos Agency, 1943, personal communication.

[92] From the Office of Indian Affairs, Washington, D. C. 1923.

[93] Plant, F. Paralysestudien bei Negern u. Indianern. 1926, Berlin.

[94] Clarke, W. Sangre impura in Mora: study of syphilis and certain other diseases in population of Mora County, New Mexico. Ann. of Int. Med. 1934, 7, 1936.

[95] Dunham, E. C., Aberle, S. D., Farquhar, L. and D'Amico, M. Physical status of 219 Pueblo Indian children. Amer. Jour. Dis. Children, 1937, *53*, 739-49.

[96] Mountin, J. W., and Townsend, J. G. Treas. Dept. Pub. Health Service Bull. 1936, Bull. 223 (Feb).

[97] Pierce, L. F. Personal communication, 1943.

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villages on the Coco River. In and around Waspam, San Carlos, and Bilwas Karma several cases were seen which appeared to have the stigmata of the disease. Dr. Daniel F. Molloy of the Rockefeller Foundation once informed Dr. George Shattuck [82] that yaws in Honduras and in Nicaragua occurred in "nests". It was our impression that the same can be said for syphilis. Several cases were seen in and about Bilwas that were being treated and although the disease does not present itself as a major Public Health problem within the Coco Basin it is important that it be treated since there is every likelihood that it will spread.

164 114 171

Yaws

Yaws is a common disease in the tropic regions of Central America and it is often seen in the subjects of the Coco Basin. There appears to be some evidence that Yaws was an ancient disease in the Americas. Hirsch [72] and Shattuck [82] agree that yaws was an importation from Africa. In a survey of a hundred patients at San Carlos nine of them yaws, three of the subjects were boys between the ages of 10 and 18 who had the typical secondary eruption of yaws. The other six patients had a mixture of annular tertiary lesions and chronic eruptions. Treponema was demonstrated in four of the patients. Although no formal survey was undertaken, Dr. Thaeler and others[99] had the impression that the disease was common in the area. The treatment of the subjects with mapharsen and bismuth salicylate results in a dramatic response, and at the end of the third weekly injection most of the lesions had disappeared. It would appear to us that a definite program could be established with regard to the treatment of yaws wherein a sustained effort in a field project coud accomplish the treatment of the majority of the cases within a short period of time. Thus a team could enter into a territory and make a definite tour with a view of treating yaws. Although the disease would probably not be eliminated by such a measure it would no doubt be suppressed in its spread to a where it might considered a minor public health problem.

164 [767]

Pinta

The disease pinta is characterized by changes in pigmentation as a result of *Treponema Carateum* infection. Is is presumed to be of

[99] Rosenfeld, L. in his survey of March, 1943 found among 200 subjects at Raiti and San Carlos, 26 of them with yaws and 18 of them with Pinta and 2 with both diseases combined.